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The Self-Transcendent Existential Present: Empirically Examining the Behavioral  
Implications and Relationships between Mindfulness, Self-Construal, and Mortality Salience

A Thesis submitted in partial satisfaction of the  
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by

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## ABSTRACT

### The Self-Transcendent Existential Present: Empirically Examining the Behavioral Implications and Relationships between Mindfulness, Self-Construal, and Mortality Salience

by

Brianna Kathryn Morseth

Contemplative traditions place considerable emphasis on using mindfulness to critically investigate the nebulous concept of “self.” In fact, insight into the true nature of self is widely regarded as a pivotal mechanism underlying the transformative effects of mindfulness practice. Despite this strong emphasis on understanding the “self” within the contemplative traditions from which mindfulness is derived, little research in psychology has explicitly examined the relationship between mindfulness and self-construal. Furthermore, while traditional mindfulness practices are understood to facilitate insight that dissolves the self-other boundary which in turn leads to behavioral manifestations of compassion, the psychological study of mindfulness has thus far largely neglected examining pro-social outcomes of mindfulness in realistic contexts, instead relying overwhelmingly on self-report measures or focusing on cognitive and clinical outcomes. Furthermore, the environmental implications of mindfulness have received hardly any attention in spite of the growing need for scalable solutions to worsening environmental conditions throughout the world. Meanwhile, social psychology has carefully investigated cultural and individual differences

in independent and interdependent self-construal and devised an experimental framework in which to examine pro-social behaviors, including willingness to help another in need as well as resource sharing.

In the present work, the existing social psychological research on self-construal is contextualized with the existing research on mindfulness. Three studies are then outlined: Study 1 serves as a correlational study intended to establish whether there is any relationship between trait mindfulness and various measures of self-construal. It also introduces a new measure of self-construal, adapted from the Inclusion of Other in the Self Scale (IOS; Aron, Aron & Smollan, 1992) for greater flexibility in measuring the perceived relationship between self and the environment, community, and one's own thoughts. Studies 2.a. and 2.b. are experimental manipulations examining the effects of a brief 10-minute mindfulness induction on subsequent pro-social (i.e., willingness to help) and pro-environmental (i.e., recycling) behaviors. Study 3 is another experimental manipulation drawing from research on terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) which suggests that mortality salience, or being reminded of the inevitability of one's own impending demise, leads to self-esteem striving, cultural world-view defense, and most notably in-group favoritism and out-group discrimination. The results of these studies are examined in the context of the convergence of mindfulness and social psychology, opening up new avenues for research in this still young and emerging field of "contemplative science."

*Keywords:* mindfulness, meditation, self, self-construal, self-transcendence, pro-social, pro-environmental, behavior, mortality salience, terror management theory, contemplative science

## The Self-Transcendent Existential Present: Empirically Examining the Behavioral Implications and Relationships between Mindfulness, Self-Construal, and Mortality Salience

Self is seemingly at the center of human experience. It is from selves that communities are built, it is between selves that social interaction takes place, and it is within the minds of selves that existential questions regarding the nature of the self and its place in the universe emerge. Social psychology deals extensively with the self in its mapping of various social orientations onto different modes of “self-construal,” defined as the degree to which elements of the social world (e.g., close relationships, contexts for behavior, or important group memberships) are included in one’s representation of the self (Markus & Kitayama, 1991; Shweder & Bourne, 1984; Triandis, 1989). However, long before the emergence of social psychology as a discipline, the nature of the self, its relationship to the rest of the world, and its very definition have been questions plaguing the minds of contemplatives and philosophers for millennia. Given the central role of self to all of human experience, it is no surprise that questions of what it means to be a “self” have featured prominently in religion, spirituality, meditation, and other means of introspection. Only recently, however, has mindfulness—a long-standing contemplative practice with Eastern religious origins, recently adapted to modern, Western, psychological, secular contexts—interfaced with social psychology.

Meditation has until roughly the last century existed as a religious practice confined to the contemplative traditions, including but not limited to Buddhism in Asia. Only within the past few decades has meditation been transformed into the secular practice of mindfulness and placed under the scrutinizing lens of Western science, a context in which it has adopted a variety of new meanings. Mindfulness is variously defined as a trait (entailing

the ability to remain focused on a chosen subset of stimuli), a state (of present-moment awareness), and a practice (involving attention-regulation in the face of mind-wandering). As a pioneer of the secular mindfulness movement and its interface with Western psychology, Jon Kabat-Zinn, in his explanation of Mindfulness-Based Stress Reduction (MBSR) as a clinical intervention, defines mindfulness as paying attention in a particular way: on purpose, in the present moment, and non-judgmentally (1990). In practicing mindfulness, one adopts an attitude of non-judgment towards the moment by moment unfolding of one's experience (Bishop et al., 2004; Kabat-Zinn, 2003). Although mindfulness initially requires deliberate effort and exertion of control in the regulation of one's fluctuating attentional states, it proceeds into an open receptivity and a relaxed effortlessness. This is reflected in phenomenological accounts of meditation. For instance, in meditation, one simultaneously experiences deep relaxation and increased internalized attention (Murata et al., 2004). For this reason, the existing research on mindfulness has primarily honed in on the effects of mindfulness practice in stress-reduction and attention-regulation.

In recent years, mindfulness research has also examined the resting state activity of the default mode network (DMN). The DMN, consisting of cortical midline regions such as the medial prefrontal cortex (mPFC) and posterior cingulate cortex (PCC) which serve as its two major "hubs," is deactivated during task performance and activated during periods of mind-wandering, otherwise understood to involve spontaneous fluctuations in attention and task-unrelated thought (Mason et al., 2007). Mindfulness meditation, the deliberate regulation of one's attention, is one means of reducing self-referential processing (i.e., thoughts centered upon oneself) and the activity of the DMN (Brewer et al., 2011; Goldin, Ramel & Gross, 2009; Hasenkamp et al., 2012). Indeed, mindfulness meditation has revealed

two distinct neural modes of self-reference: 1) narrative focus, linked to self-referential cortical midline regions such as the mPFC, and 2) experiential focus, linked to reductions in mPFC activity (Farb et al., 2007). In the context of mood disorders, mindfulness has been shown to reduce evaluative processing supported by midline structures through the decoupling of the right insula and the mPFC, implying less conscious processing of somatosensory states (Farb et al., 2010). Mindfulness thus contributes to enhanced present moment awareness of unelaborated immediately experienced sensations, primarily through recognizing and disengaging from conceptual judgement. In other words, mindfulness can enable greater awareness of the immediate experience without added conceptualization and narrative construction, which tend to characterize ruminative self-referential processing.

Due to its usefulness in reducing ruminative self-referential processing, mindfulness has been widely used among patient populations. Clinical applications of mindfulness have been particularly efficacious among patients dealing with chronic pain, stress, anxiety, and depression (Kabat-Zinn, 2003). A key reason for the use of mindfulness in the Mindfulness-Based Cognitive Therapy (MBCT) program to address risk of depressive relapse stems from the relationship between mindfulness and activity of the DMN (which are negatively correlated) and the relationship between activity of the DMN and depression (which are positively correlated). In a clinical sample, depressed but not control subjects exhibited a failure to reduce activity of DMN regions while viewing negative affect pictures and reappraising them (Sheline et al., 2009). As a clinical intervention for depression, MBCT reduces ruminative self-referential processing and thereby activity of the DMN through the process of decentering, defined as experiencing thoughts and feelings as transient, impersonal, and not necessarily accurate (Teasdale et al., 2002). It enables patients to “know



the inner and outer landscape” by recognizing that their experience in the present moment is severely edited and often distorted through the routinized, habitual, and unexamined activity of thoughts and emotions (Kabat-Zinn, 2003). Filtering experiences through a narrative mode of self-reference tends to layer biases and assumptions upon the experiences themselves, a tendency that mindfulness challenges.

While these outcomes are consistent with the intention behind mindfulness to question the nature of the self and one’s habitual patterns of thought, they are largely cognitive and relatively removed from the social world, in which self-other delineation is pervasive. Despite the long tradition of questioning the self in contemplative practices, including Buddhist meditation, and more recent cognitive neuroscience research on mindfulness and self-referential processing, very little has been investigated in the way of mindfulness and self-construal, a central construct in social psychology. Granted, in spite of its long history in the East, mindfulness has only been on the radar of social psychologists in the West for a few decades, providing little opportunity thus far for social psychological investigations of the relationship between dispositional mindfulness and self-construal, much less the effects of mindfulness practice on self-construal at a causal level. This work therefore aims to examine the overlap, both empirical and theoretical, between mindfulness and self-construal, laying the ground for future social psychological research on this emerging topic.

### **Self, Itself: Construing and Constructing the Self**

In the psychological study of the self, especially within the sub-disciplines of social and cultural psychology, self-construal has emerged as a key concept with vast implications for human interaction. Simply put, self-construal refers to how an individual develops and

defines their relationship with the self, with others, and between the self and others (Kashima et al., 1995; Markus & Kitayama, 1991; Singelis, 1994). Very broadly, self-construal also refers to what people believe about themselves, which takes a variety of forms and may be influenced by social factors and conditions ranging from culture to social expectations and norms (Shweder & Levine, 1984; Triandis, 1989). Given the diversity of selves in the world, the ways in which people construe themselves are arguably as myriad as there are people, though a handful of distinct categories of self-construal have been set forth. The two most widely researched of these are the independent and interdependent selves, often linked to culture.

One possible reason for the lack of research on the relationship between mindfulness and self-construal may actually be cultural in origin, insofar as mindfulness has a much longer history in interdependent or collectivist cultures and has only recently been introduced to cultures that could be called independent or individualistic. Notably, individualism and collectivism, the conceptualization of the self as either an individual separate from context or as embedded within the collective, respectively (Triandis et al., 1988) are the constructs in widest use for explaining differences between cultural groups in self-construal. While collectivists define themselves as parts or aspects of a group, individualists focus on self-concepts that are autonomous from groups (Singelis et al., 1995). Western cultures are thought to rely primarily on individualist self-construal while non-Western cultures rely on collectivist self-construal (Triandis, 1995). The gap in the mindfulness/self-construal literature is thus likely in part due to the individualistic orientation of the secular mindfulness movement versus the collectivistic orientation of monastic orders and other communal settings in which meditation was traditionally practiced. It should be noted, however, that this

bifurcation of self-construal into individualist or collectivist cultural orientations does not imply that cultures are monolithic and homogenous. In other words, not all people of Western cultural background are individualists and not all people of non-Western cultural background are collectivists. Regardless, they have been found to be useful distinctions and as such will be treated dichotomously throughout the pages that follow despite the complexity that lies within each category, culture, and the selves that comprise them.

From the original distinction between individualism and collectivism emerged the concepts of independent and interdependent selves, which also underlie the different cultural orientations toward mindfulness. These selves have been measured and defined in reference to the emphasis on connectedness and relationships (interdependent self-construal) more common among non-Western cultures, and to the separateness and uniqueness of the individual (independent self-construal) emphasized in the Western world (Singelis, 1994). An interdependent self-construal characterized by the fundamental relatedness of individuals to one another prevails in many Eastern cultures (Markus & Kitayama, 1991). This may explain why traditional meditation practices, which originate in collectivist cultures, emphasize self-transcendence or going beyond one's own desires and concern for the ego, at least more-so than in the West where secular mindfulness has been used for individual purposes.

In the Western secular mindfulness movement, expectations of personal benefits of mindfulness practice dominate over collective benefits, which is virtually unheard of in non-Western cultures where the community is given greater importance than the individual. Indeed, there is a decreased tendency to view oneself as an independent agent among members of non-Western cultures (Kashima et al., 1995), where instead, people view

themselves as members of various groups, clans, tribes, etc. (Triandis, 1995). This is contrasted with Western conceptions of the self, dominated by an independent self-construal in which individuals seek to maintain their individuality and independence from others by attending to the self and expressing their uniqueness (Markus & Kitayama, 1991). This mode of self-construal, and arguably worldview, involves praising, elevating, and asserting the self—after all, individualists are motivated by their own preferences, needs, and rights, giving priority to personal rather than to group goals—accounting for much of the competition observed in Western society (Triandis, 1995). The differences between independent and interdependent self-construal are especially relevant to the social psychological study of mindfulness and the consideration of new contexts for the development and propagation of mindfulness, which has traversed cultural boundaries in recent decades.

Given that mindfulness originated in a non-Western cultural context, where it was practiced and adopted into the mindset and worldview of its host culture for over 2,500 years, its more recent introduction to the Western world provides an entirely different cultural context in which to investigate its psychological outcomes and correlates. For instance, in 13<sup>th</sup> century Japan, Zen master Dogen, a major proponent of meditation, is reported to have stated:

"To study the Buddha Way is to study the self. To study the self is to forget the self. To forget the self is to be actualized by myriad things. When actualized by myriad things, your body and mind as well as the bodies and minds of others drop away. No trace of enlightenment remains, and this no-trace continues endlessly."

— Dogen (trans. Tanahashi, 1995)

This type of self-transcendence requires a fundamental shift in self-construal, so that one no longer identifies as an individual "body and mind" and instead becomes "actualized by myriad things" in a collective sense, a perspective that is alien to the majority of Westerners.

Notably, much of the existing research on mindfulness in the West has been from an individual gains perspective, without much focus on self-transcendence or the collective, societal, or group benefits derived from the practice. This may indeed be a result of the predominant mode of self-construal, that of individualism and independence, in Western culture, with which the majority of modern mindfulness researchers are inescapably affiliated. The Western view of the individual as an independent, self-contained, autonomous entity assumes something both socially and metaphysically at odds with Eastern conceptions of the self. To the Western mind, the individual comprises a unique configuration of internal attributes and behaves primarily as a consequence of these attributes (Sampson, 1989; Shweder & LeVine, 1984). On the other hand, the Eastern conception of self emphasizes harmonizing oneself with others in interdependence and gives little importance to unique internal attributes and the centrality of their motivating effects on behavior (Markus & Kitayama, 1991). Beyond these two modes of self-construal—the independent self, alone and disconnected from others, and the interdependent self, fundamentally connected to others and intimately interwoven into the fabric of society—lies the mindful self, which may be a form of self-construal that can be induced or primed.

### **Mindfully Changing Selves: Priming Self-Construal**

Among Western psychologists and laypeople alike, it is commonly assumed that one remains more or less the same “self” throughout life, maintaining a core personality or essence that does not become radically altered, except for in the case of severe trauma (see

the case studies associated with Phineas Gage, Patient K.C., Patient H.M., etc.). For the most part, any given person is assumed to be the same person throughout their entire existence. One does not change selves as one would change clothes, as “self” is typically not seen as an outer layer that can be stripped off, but rather an inner core. Yet studies have shown that self-construal can be primed, contributing to measurable shifts in both social and perceptual outcomes (Gardner, Gabriel & Lee, 1999; Haberstroh et al., 2002; Jiang et al., 2014; Oyserman & Lee, 2008; Sui & Han, 2007; Wang, Ma & Han, 2014). In these studies, people have been induced to adopt different views on their independence or interdependence on the basis of experimental influence, a finding that challenges the notion of an in-built, static and concrete self.

However, the effectiveness of self-construal priming may still be modulated by culture. For instance, one may observe the same pattern of results by priming two cultures in different ways. In a study examining the distinct effects of self-construal priming on empathic neural responses in Chinese and Western participants, neural responses to stimuli depicting painful (vs. non-painful) situations were decreased by interdependent self-construal priming among Chinese but by independent self-construal priming among Westerners, suggesting that self-construal priming modulates sensitivity to perceived pain but that this effect varies with culture (Jiang et al., 2014). Thus, perhaps mindfulness can achieve the same outcomes among different cultures via different pathways, by either priming or inducing different self-construal processes.

That different self-construals can be primed suggests a certain malleability of the self and social identity. As defined by Tajfel (2010), social identity is the part of an individual's self-concept that derives from 1.) their knowledge of social group membership and 2.) the

emotional significance and value ascribed to that membership. Relative to personal identities which take shape at the individual level, social identities are inherently contextual and dependent upon the collective (Brewer, 1991). Moreover, these identities are not mutually exclusive, but malleable, insofar as a person may shift between them. This would suggest that it is possible for the goal of mindfulness practice to shift depending on the context in which a practitioner engages with the practice. For instance, an obvious difference in social orientation and identity exists between a Westerner who practices mindfulness within the context of a group or tradition for purposes that transcend the self, versus one who does so for personal reasons, such as for stress relief within a medical context. In fact, the same individual may have begun to practice mindfulness for individual benefits yet later shifted to a more collectivist oriented practice. Such a shift in self-construal is supported by social identity theory, which takes into account the role of context.

Although conditioned by one's cultural upbringing, one can shift between selves—perhaps not as radically as completely changing one's entire identity, but nonetheless through momentary shifts in one's perception of self in relationship to others. The ease with which this can be accomplished is startling. Many self-construal priming studies utilized simple verbal tasks—reading a story containing independent or interdependent themes and circling either individually-oriented pronouns (e.g., I, mine) or group-oriented pronouns (e.g., we, ours) in a paragraph of prose. For instance, subjects who were primed to view the self as independent endorsed individualist values and reported lower social obligations to others while subjects who were primed to view the self as interdependent endorsed collectivist values and reported higher social obligations to others (Gardner, Gabriel & Lee, 1999). Priming's effectiveness indicates the ease with which self-construal can be shifted. The

implications for mindfulness are promising. Although no research to date demonstrates it, hypothetically, through mindfulness one could shift willfully between “selves.”

### **“Solo Mindfulness” and the Independent Self**

Independent self-construal refers to the perception of a bounded, unitary, stable self and emphasizes the separateness, internal attributes, and uniqueness of individuals (Markus & Kitayama, 1991; Singelis, 1994). Mindfulness might initially seem to complement this sense of independence, insofar as it is an inward-looking and thus intrapersonal (as opposed to interactive and interpersonal) practice. Indeed, there is every external indication that mindfulness is a solitary, quiet, and thus asocial exercise in self-monitoring. For instance, mindfulness practice fosters non-judgment of one’s internal experience and thus increases self-esteem, which for some may increase the sense of independence and self-mastery. Yet despite research associating independent self-construal with personal well-being and self-esteem (Cross, Gore, & Morris, 2003; Elliott & Coker, 2008; Kwan, Bond & Singelis, 1997; Pilarska, 2014) and revealing correlations between mindfulness, well-being, and self-esteem (Brown & Ryan, 2003; Carmody & Baer, 2008; Shapiro et al., 2008), there have been no studies linking mindfulness directly to independent self-construal.

However, some research may be interpreted to suggest that mindfulness increases perceptions of personal autonomy. For example, experimental manipulations demonstrate that mindfulness increases self-control (Bowlin & Baer, 2012; Frieze, Messner & Schaffner, 2012). Indeed, many studies document the personal benefits derived from mindfulness practice, including clinical outcomes such as decreases in stress, anxiety, and depression (Grossman et al., 2004; Kabat-Zinn, 2003; Shapiro et al., 2006) and cognitive outcomes such as increases in attention and executive control (Evans, Baer, & Segerstrom, 2009; Jha et al.,



2007). These individual gains, ostensibly having little relation to social psychological outcomes, can be personally empowering to those who reap them, contributing to an enhanced sense of independence.

Because mindfulness is stereotypically considered a solitary practice, it is possible that it is capable of priming an independent self-construal, which as a mediator or moderator may then account for additional psychological outcomes associated with mindfulness. Studies have indeed shown that priming self-construal contributes to measurable changes in observable psychological outcomes, suggesting that self-construal may be a mediator or moderator (Pilarska, 2014; Ma et al., 2013). For instance, experimentally, an independent-self prime steers visual preferences towards “local” stimuli (Lin, Lin & Han, 2008). Similar findings extend to the neural level, where priming independent self-construal contributes to greater neural activity in the right middle frontal cortex when viewing one’s own rather than familiar faces (Sui & Han, 2007). Independence-primed participants are also more susceptible to greater redundancy in conversation, as measured by repetition when asked about closely related concepts (Haberstroh et al., 2002). Although no studies have explicitly tested this, the pattern of results resembles what one might expect in the case of mindfulness, which disengages from interaction with “others” and focuses instead on the localized, so-called “self.”

### **“Social Mindfulness” and the Interdependent Self**

In contrast, interdependent self-construal refers to the perception of a flexible, variable self and emphasizes connectedness, social context, and relationships (Singelis, 1994). Among interdependent selves is found a pervasive attentiveness to relevant others in one’s social context, making one’s activities situationally-bound, thus resulting in a highly

contextualized self (Markus & Kitayama, 1991). This attentiveness is not unlike mindfulness, especially the newly conceptualized construct “social mindfulness,” which entails “focusing attention on the needs and interests of others in situations of interdependence” (Van Doesum et al., 2013).

Indeed, the work from which social mindfulness as a concept derives is a classic cultural psychology experiment. When presented with a choice of pens in which one color was more common and the other color unique, East Asians (interdependent self-construal) were more likely to choose one of the several common pens while European-Americans (independent self-construal) chose the single unique pen (Kim & Markus, 1999). The Social Mindfulness (SoMi) paradigm adapted this experiment by using a unique item and common items in a task in which “you choose first, then the other person” (Van Doesum et al., 2013). People higher in social mindfulness are able to recognize the impact of their own actions upon others—namely that if they choose the unique item, they are essentially depriving the other person, who is left with two or more of the common item, of a choice in the matter. Although relatively new, surprisingly little attention is paid to the concept of social mindfulness, which is rife with potential connections to self-construal.

In the above case, an independent self-construal (which emphasizes individual uniqueness; Markus & Kitayama, 1991) may be predicted to contribute to the selection of a unique item, and by implication, would be associated with lower social mindfulness. In contrast, an interdependent self-construal is more likely to be associated with higher social mindfulness, the ability to take into account others in situations of interdependence. Indeed, people with other-oriented mindsets left interdependent-others greater choice than people with self-oriented and/or unspecified mindsets (Van Doesum et al., 2013). In another study,

strong interdependent self-construals were correlated with increased susceptibility to embarrassment (Singelis & Sharkey, 1995). This corroborates the theory of the interdependent self-construal as a socially embedded self greatly influenced by context and aspiring toward harmonization with the collective (Markus & Kitayama, 1991). In other experimental contexts, an interdependent prime steers visual preferences towards “global” stimuli (Lin, Lin & Han, 2008). This finding also lends credence to the notion that an interdependent self-construal involves taking the “bigger picture” (whether global stimuli or social context) into consideration, thus adopting a more inclusive perspective.

Although it has not been empirically tested, it is possible that the interdependent self-construal disengages self-referential processing, which is also disengaged by mindfulness (Brewer et al., 2011). Disengaging from the tendency to associate with “I, me, and mine” characterizes mindfulness practice remarkably well, and in disengaging from this “self-ing,” one is said to transcend suffering. Yet whether this entails a shift to a “we-self” or “non-self” remains to be addressed in an empirical context.

### **“Existential Mindfulness” and the Defense of Self**

A primary motivating factor for “self-ing,” or the tendency to construe the self through self-reference of various sorts, may be existential in nature. Terror Management Theory (TMT) suggests that a fundamental need for self-esteem drives all human behavior and counteracts the terror evoked by recognition of one’s own mortality (Greenberg, Pyszczynski, & Solomon, 1986). Constructing a self that one views favorably can thus be considered an existential defense mechanism and anxiety buffer. Indeed, self-enhancement has been called a universal human motive, traversing cultural lines (Sedikides, Gaertner, & Toguchi, 2003). Yet such cultural lines are often the basis for self-esteem defense, giving rise

to the tendency to differentiate between oneself and others, between one's in-group and the out-group.

Ernest Becker proposes that self-esteem and culture feature prominently in providing a sense of meaning, value, and security in a threatening, indeterminant universe in which only death is certain (1971, 1973). Confirming this relationship, research shows that threats to an individual's cultural worldview, which is integral to personal identity and existential meaning, leads to self-esteem striving (Pyszczynski et al., 2004). Due to its emphasis on non-judgmental acceptance and present-moment awareness, mindfulness may function as a means of reducing existential anxiety while challenging deeply held opinions about the self as a distinct entity, thereby reducing the need to employ self-defense mechanisms in response to threats to one's own cultural worldview.

Because "self" is often regarded, either consciously or unconsciously, as a central element of existence, activity in favor of self-preservation is thus understandably a common theme throughout the developmental lifespan. In fact, according to Yalom (1980), the desire for psychological "immortality" is the default response to existential anxiety. At the same time, Erikson's eight stages of the lifecycle (1960) are characterized by existential questions and the conflicts they raise for the individual. Although forms of existential angst may exist early in the lifespan, self-preservation and ego integration in the later stages of development tend to become central to one's activities as one approaches death. Yet regardless of one's developmental stage or cultural orientation, ego-obsession, excessive focus on self-preservation, and avoidance of the present by mentally projecting oneself into the past or future can become maladaptive to both one's individual psychological well-being and one's social functioning.

One approach to addressing these maladaptive states is through mindfulness, which also has an existential component. Spearheaded by Jon Kabat-Zinn (1990), mindfulness meditation has gained notoriety as a promising treatment for maladaptive self-reference by enabling the individual to remain present to the continuous unfolding of the immediate experience. Thus, mindfulness can perhaps dampen self-centeredness by decreasing the desire for psychological immortality and self-preservation in response to death anxiety and instead reorienting the mind to the present moment, training the individual to remain open, receptive, and equanimous to whatever arises, whether pleasant or unpleasant, nonjudgmentally—a perspective which has implications for experimental research combining mindfulness theory with existentialism and social psychology.

Regardless of which stage of the lifecycle, to confront the inevitability of one's own death causes immense dissonance in the mind of the individual and raises the crisis of meaninglessness, which “stems from the dilemma of a meaning-seeking creature who is thrown into a universe that has no meaning” (Yalom, 1980, p. 9). Upon recognizing one inhabits a world in which the only certainty is death, it may feel as if all meaning in life has been lost, leaving the individual with a sense of existential terror. According to Terror Management Theory (TMT), this existential terror results from the desire to live while being forced to acknowledge the reality of death (Greenberg, Pyszczynski, & Solomon, 1986). Importantly, empirical research on TMT indicates that mortality salience, or bringing to mind thoughts of one's own death, leads to self-esteem striving, which involves pursuit of positive self-evaluations as a means of buffering against the terror and anxiety evoked by the uniquely human awareness of mortality (Pyszczynski et al., 2004). The effect of self-esteem striving as a byproduct of mortality salience is so strong that it often leads to in-group favoritism and

out-group discrimination, as measured by positive ratings of individuals who uphold one's cultural worldviews and negative ratings of those who violate them (Rosenblatt et al., 1989; Greenberg et al., 1990). Similarly, realistic group conflict theory proposes that opposing claims to scarce resources, whether power, wealth, or prestige, generate ethnocentrism and antagonism between groups while contributing to in-group favoritism and out-group discrimination (Tajfel & Turner, 1979). In this case, the existential uncertainty of access to resources, many of them social, is buffered by self-esteem inflation at the expense of others who are perceived to be different. These findings suggest that self-esteem striving in response to death anxiety—the experience of existential terror that can be encountered at any stage of the lifecycle—has negative social outcomes.

The only published empirical research examining the relationship between mindfulness, social cognition, and mortality salience (combining the theories outlined thus far) yielded promising results supporting the theory that trait mindfulness may reduce the effects of mortality salience on out-group discrimination (Niemic et al., 2010). Specifically, after a mortality salience prime in which subjects were asked to reflect on the thought of their own death, less mindful individuals showed higher worldview defense as well as higher self-esteem striving. In other words, individuals who scored low in trait mindfulness were more likely to defend their own views as a means of self-preservation. The same study also found that higher trait mindfulness reduced racially defensive responses to mortality salience (i.e., higher mindfulness scores predicted decreased racial discrimination) and that participants lower in trait mindfulness made harsher judgments of social transgressions (i.e., lower mindfulness scores predicted harsher judgement of others) under mortality salience. Perhaps most relevant is that higher trait mindfulness predicted less suppression of death-related

thoughts immediately following mortality salience. This suggests that mindfulness, characterized by present moment awareness that does not avoid the reality of impermanence but instead confronts it without judgement, may be a viable solution to existential terror encountered at the various stages of the developmental lifecycle.

The present research thus ambitiously aims to examine the purported relationship between mindfulness, self-construal, pro-social and pro-environmental behavior, and terror management theory. Study 1 employs a correlational design to investigate the relationship between trait mindfulness and various self-construal measures. *It is hypothesized that trait mindfulness will be more-so correlated with interdependent self-construal (e.g., collectivism) than with independent self-construal (e.g., individualism).* In study 1, a new measure of self-construal is also introduced and piloted, namely the Inclusion of Other in the Self Scale – Revised (IOS-R), which uses a Venn-diagram model of overlapping circles to measure perceived connection between self and the environment, community, and thoughts. *It is hypothesized that mindfulness will be associated with greater self-environment and self-community overlap and less self-thoughts overlap* due to the ability of the mindful person to decenter from thoughts, meaning thoughts are experienced as mental events rather than as the self (Teasdale et al., 2002). In studies 2.a. and 2.b., an experimental design is employed to examine the effects of mindfulness on pro-social and pro-environmental behavior. *It is hypothesized that relative to a control group, the mindfulness induction will lead to greater self-environment and self-community overlap, less self-thoughts overlap, and higher rates of pro-social and pro-environmental behavior.* In study 3, an experimental design is employed to examine the effects of a mortality salience prime (relative to a control prime) followed by a mindfulness induction (relative to a control task) on in-group favoritism and out-group

discrimination. *It is hypothesized that the mindfulness induction will dampen the negative effects of the mortality salience prime, preventing in-group favoritism and out-group discrimination.* These studies will be discussed in detail in the pages that follow.

## **General Method**

In the studies reported here, all testing took place in the Psychology Building through the Department of Psychological and Brain Sciences at the University of California in Santa Barbara in individual testing rooms equipped with a desktop computer. All data were obtained through Qualtrics™ online survey software and analyzed using SPSS™.

## **Study 1 Method**

### **Participants**

130 undergraduates (aged 17-25:  $M = 18.79$ ,  $SD = 1.277$ , 89 Female) enrolled in Psych 1 and Psych 7 were recruited through the UCSB Sona Systems subject pool to participate in a half-hour study entitled “Drawing and Social Cognition.” Subjects received course credit for their participation.

### **Procedure**

After indicating their consent upon arriving in the laboratory, subjects were asked to complete a drawing exercise. Each subject was presented with a packet of paper containing boxes in which to draw two circles representing the relationship between “self” and [the other category], adapted from the Inclusion of Other in the Self Scale (IOS; Aron, Aron & Smollan, 1992) but in continuous rather than discrete form and with size variation in self-other circles permitted. The “other” category was exchanged for “community,” “environment,” and “thoughts,” yielding three pairs of circles.



Subjects were then assigned to an individual cubicle where they completed the following surveys via Qualtrics on one of the desktop computers provided: Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), Perceived Stress Scale (PSS; Cohen, 1983), Interpersonal Reactivity Index - Empathic Concern Subscale (IRI; Davis, 1980, 1983), Satisfaction With Life Scale (SWLS; Diener et al., 1985), Connectedness to Nature Scale (CNS; Mayer & Frantz, 2004), Self-Compassion Scale - Common Humanity and Isolation Subscales (SCS; Neff, 2003), Rosenberg Self Esteem Scale (RSES; Rosenberg, 1965), Generalized Self Efficacy Scale (GSES; Schwarzer & Jerusalem, 1995), and Individualism-Collectivism Scale (ICS; Triandis & Gelfand, 1998). After completing the surveys, subjects were thanked and assigned credit for participating.

### **Study 1 Results**

All paper-based circle-drawings were measured by hand by research assistants using standard office rulers, with units reported in millimeters. Data were entered by each research assistant into a common Excel spreadsheet, where subsequent calculations were performed to obtain the percentage of overlap between the two circles (area of overlap relative to the combined area of the two circles) and a size ratio (area of “self” circle relative to area of “other” circle). These data were then combined with the data contained in the SPSS spreadsheet, where sums and averages for self-report measures were computed. Behavioral observations were tallied and entered as dichotomous variables, with 0 indicating a subject did not perform the behavior in question and 1 indicating a subject performed the behavior in question.

Data from Study 1 were subject to correlational analysis. Bivariate correlation revealed noteworthy correlations among the following: self-thoughts overlap and satisfaction

with life (SWLS;  $R = .226, p = .01$ ); self-community overlap and horizontal collectivism (ICS-HC;  $R = .149, p = .091$ ), vertical collectivism (ICS-VC;  $R = .190, p = .031$ ), collectivism (ICS-C;  $R = .242, p = .005$ ), and common humanity (SCS-CH;  $R = .210, p = .016$ ); self-environment overlap and connection to nature (CNS;  $R = .175, p = .046$ ). Furthermore, trait mindfulness (MAAS) correlated negatively with vertical individualism (ICS-VI;  $R = -.175, p = .047$ ) and positively with horizontal collectivism (ICS-HC;  $R = .180, p = .041$ ). Trait mindfulness (MAAS) also correlated positively with common humanity (SCS-CH;  $R = .287, p < .001$ ) and negatively with isolation (SCS-I;  $R = -.290, p < .001$ ). Connection to nature (CNS) correlated with horizontal collectivism (ICS-HC;  $R = .373, p < .001$ ), overall collectivism (ICS-C;  $R = .336, p < .001$ ), and empathic concern (IRI-EC;  $R = .244, p < .005$ ). Empathic concern (IRI-EC) was correlated with self-environment size ratio ( $R = .232, p = .008$ ).

### **Study 1 Discussion**

In Study 1, self-thoughts overlap was positively associated with satisfaction with life. This correlation was initially puzzling, as it was originally hypothesized that self-thoughts overlap would be negatively correlated with trait mindfulness and that trait mindfulness would be positively correlated with satisfaction with life. That satisfaction with life is associated with greater self-thoughts overlap is surprising, as it seems to suggest that life satisfaction is associated with identifying more with one's thoughts. However, the affective valence of subjects' thoughts, or the particular types of thoughts they identified with (as reflected by greater overlap) was never solicited, leaving the meaning and implications of greater self-thoughts overlap unclear. Future studies should aim to clearly define the types of thoughts in question by providing, for instance, a box for self-positive thoughts overlap and

another for self-negative thoughts overlap for the purpose of disambiguation, or alternatively, allow subjects to specify what types of thoughts they intend to depict in their drawings. An alternative explanation for the association between self-thoughts overlap and satisfaction with life is that greater self-thoughts overlap reflects a more equanimous and less resistant orientation to thoughts, which mindfulness promotes through its emphasis on non-judgement.

Study 1 also revealed that self-community overlap is positively associated with horizontal collectivism, vertical collectivism, overall collectivism, and common humanity, lending support to the validity of the IOS-R in measuring the construct of closeness to the community in the forms of the collective and humanity. Study 1 further demonstrated that self-environment overlap is associated with connection to nature, another piece of support for the validity of the IOS-R in measuring the construct of closeness to the environment in the form of connection to nature. Both of these data points confirm that self-community and self-environment overlap are understood by subjects to refer to closeness with one's community and one's environment, respectively, which is relatively straightforward and less ambiguous than self-thoughts overlap, which as discussed above, has no specific referent in its present form.

Furthermore, trait mindfulness was negatively associated with vertical individualism and positively associated with horizontal collectivism. This suggests that there is perhaps a subtle social element to the tendency toward present moment awareness. It may be the case that horizontal collectivists (those who value egalitarianism and the group) are more aware of their immediate surroundings and even the effects of their own actions on the “others” (whether the community or the environment) around them. Trait mindfulness was also positively associated with common humanity and negatively associated with isolation, again

suggesting a social-connectedness component to bare attention, which is the aspect of mindfulness the MAAS emphasizes and captures.

That connection to nature was positively associated with horizontal collectivism, overall collectivism, and empathic concern suggests that there is a relationship between environmental identification and community identification. That empathic concern was positively associated with self-environment size ratio so that more empathy was associated with more similarity between self and environment sizes further confirms this hypothesis. The data suggests that seeing oneself as more similar to the environment (i.e., in size) and seeing oneself merging with the environment (i.e., in overlap) reflects greater empathy for and connection to nature.

## **Study 2.a. Method**

### **Participants**

Subjects included 54 UCSB undergraduates (aged 18-23:  $M = 18.96$ ,  $SD = 1.183$ , 33 Female) enrolled in Psych 1 and Psych 7 recruited through the UCSB Sona Systems subject pool to participate in a half-hour study entitled “Attention and Experiences.”

### **Procedure**

Upon arriving in the laboratory, subjects were asked to provide their informed consent. Subjects were then randomly assigned to individual cubicles equipped with desktop computers to complete a set of surveys on Qualtrics. The first set of surveys included the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), Connectedness to Nature Scale (CNS; Mayer & Frantz, 2004), and Interpersonal Reactivity Index - Empathic Concern Subscale (IRI; Davis, 1980, 1983. Subjects then reached a page on Qualtrics that

instructed them to pause and inform the researcher that they were ready for the next part of the experiment.

Once all subjects had completed the first set of surveys, they were randomly assigned to one of two conditions: 1.) 10-minute mindfulness of breathing induction involving paying attention to the breath, or 2.) 10-minute reading task involving a filler article on human respiration. The instructions used in condition 1 were based on standard guided mindfulness practices included in Mindfulness-Based Stress Reduction (MBSR). The article used in condition 2 was excerpted from Wikipedia. Both conditions were framed as an “attention exercise” (paying attention to the breath in the context of mindfulness, paying attention to the text in the context of reading) in an effort to control for demand characteristics.

After the 10-minute attention exercise, subjects were given a quarter sheet of paper with their subject ID number at the top and asked to either draw or write a brief (no more than 30 seconds) reflection on the “attention exercise” (mindfulness vs. reading). Before they began, they were told that the researcher would not be collecting the paper and that the reflection exercise was simply intended to get them to briefly reflect on the activity they just engaged in for the past 10 minutes. In actuality, the quarter sheet of paper was critical at the conclusion of the study, to be described in detail below.

After the brief reflection exercise, subjects were then asked to complete a circle drawing exercise, in which they were presented with a packet of paper containing boxes in which to draw two circles representing the relationship between “self” and [“community,” “environment,” “thoughts”] modeled after the Inclusion of Other in the Self Scale (IOS; Aron, Aron & Smollan, 1992).

After completing the drawing exercise, subjects were then asked to continue where they left off with the surveys on Qualtrics in their individual cubicles. The second set of surveys included the Situational Self-Awareness Scale (SAAS; Govern & Marsch, 2001) and Toronto Mindfulness Scale (TMS; Lau et al., 2006).

Measures of pro-environmental and pro-social behavior were recorded through observation. At the conclusion of the surveys, subjects were reminded that the reflection exercise was for their own benefit and that the quarter sheet of paper was not needed by the researcher. They were told they could “dispose of the piece of paper” on their way out of the lab. A clearly identifiable recycling bin (a blue plastic bin with white recycling logo containing several pages of white printer paper) was placed directly next to a trash can (a gray tin can lined with a black trash bag containing miscellaneous foodscraps and used tissues), both equidistant from the exit. Measures of pro-environmental behavior were derived from observations of whether subjects placed their quarter sheet of paper in the recycling bin vs. trash can. The experimenter’s research assistants retrieved these papers from their respective receptacle after all subjects left, and using the subject ID number at the top of each piece of paper, tallied whether subjects disposed of the paper in the recycling bin or trash can. Disposing of the paper in the recycling bin was classified as pro-environmental behavior.

The morning after the day subjects completed the experiment in the lab, each subject was individually contacted via email (using the email addresses listed on the Department of Psychological & Brain Sciences UCSB Psychology Research Participation Sign-Up Sona Systems website) and told that due to a technical error in the lab, their data file was lost. They were informed that they still received credit for participating but that the loss of data

was an inconvenience to the researchers. They were then asked if they would be willing to come back to the lab, even though there would be no direct benefit to them, at a time of their own convenience to help the researcher by filling out the survey portion of the study again. An affirmative answer was classified as pro-social behavior. Subjects were debriefed by email only after completion of all experimental procedures.

### **Study 2.a. Results**

Data from Study 2.a. were subject to independent t-test. Pre-induction, subjects randomly assigned to the mindfulness and control conditions did not differ in trait mindfulness (MAAS;  $t(52) = .783, p = .437$ ), empathic concern (IRI-EC;  $t(52) = .814, p = .42$ ), or connection to nature (CNS;  $t(52) = -1.668, p = .101$ ). Furthermore, post-induction, conditions did not differ in self-awareness (SAAS;  $t(52) = .165, p = .870$ ). However, post-induction, subjects in the mindfulness condition scored significantly higher on state mindfulness than subjects in the control condition (TMS;  $t(52) = -2.133, p = .038$ ).

Moreover, at the behavioral level, subjects in the mindfulness condition were significantly more likely to recycle ( $t(52) = -2.096, p = .041$ ), less likely to use the trash ( $t(52) = 3.053, p = .004$ ), more likely to volunteer their time to return to the lab to help recover “lost data” a day later ( $t(52) = -2.180, p = .034$ ). In the circle-drawing task, subjects in the mindfulness condition were significantly more inclusive in self-community overlap ( $t(52) = -2.007, p = .05$ ) but did not differ from control subjects in self-environment overlap ( $t(52) = -.972, p = .335$ ) or self-thoughts overlap ( $t(52) = -.870, p = .388$ ).

### **Study 2.a. Discussion**

In Study 2.a., subjects in the mindfulness condition were significantly more likely to recycle, less likely to use the trash, and more likely to volunteer their time to return to the lab

to help recover “lost data” even when asked a day after participating in the experiment. This seems to suggest the pro-environmental effects of even a 10 minute mindfulness practice are immediate and that the pro-social effects persist beyond the mindfulness session itself. Of course, the average amount of time such effects persist remains to be investigated.

As there were no pre-induction differences between the mindfulness and control conditions in MAAS, IRI-EC, and CNS scores, it is unlikely that trait mindfulness or baseline empathic concern and connection to nature could account for the observed pro-social and pro-environmental behaviors. Since there were also no post-induction differences between the mindfulness and control conditions in SAAS scores, it is unlikely that general self-awareness could account for the observed behavioral outcomes. However, that subjects in the mindfulness condition scored significantly higher on the TMS suggests a possible role for state mindfulness in accounting for the observed pro-social and pro-environmental behaviors.

Post-induction, subjects in the mindfulness condition were significantly more inclusive in their depictions of self-community overlap but did not differ from control subjects in self-environment overlap or self-thoughts overlap. This suggests a possible role for self-community overlap as a mediating variable linking mindfulness and pro-social behavior.

## **Study 2.b. Method**

### **Participants**

Subjects included 60 UCSB undergraduates (aged 18-22:  $M = 19.47$ ,  $SD = 1.096$ , 31 Female) enrolled in Psych 1 and Psych 7 recruited through the UCSB Sona Systems subject pool to participate in an hour-long study entitled “Attention and Experiences.”



## Procedures

After consenting to participate, subjects were assigned to individual cubicles equipped with desktop computers to complete a set of surveys on Qualtrics. The first set of surveys included the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), Connectedness to Nature Scale (CNS; Mayer & Frantz, 2004), Santa Clara Brief Compassion Scale (SCBCS; Hwang, Plante, & Lackey, 2008), and Self Importance of Moral Identity Scale (SIMIS; Aquino, 2002). Subjects then reached a page on Qualtrics that instructed them to pause and inform the researcher that they were ready for the next part of the experiment.

Once subjects completed the first set of surveys, they were assigned to one of three conditions: 1.) 10-minute mindfulness of breathing audio induction involving paying attention to the breath, 2.) 10-minute audio lecture on human respiration, or 3.) 10-minute positive mood induction through music. The instructions used in condition 1 were an audio recording by Jon Kabat-Zinn in a Mindfulness-Based Stress Reduction (MBSR) workshop. The lecture used in condition 2 was educator.com instructor Bryan Cardella's piece on the physiology of the respiratory system. The music used in condition 3 was a freely-available looped version of Delibes' "Coppelia," previously shown to reliably induce positive mood (Sutherland et al., 1982; Matthews & Bradley, 1983; Teasdale & Spencer, 1984; Clark & Teasdale, 1985; Albersnagel, 1988; Mayer et al., 1990; Lenton & Martin, 1991; Parron, 1991; Parron & Sabini, 1991; Bouhuys et al., 1995; Willner et al., 1998; Clark et al., 2001). All three conditions were framed as an "attention exercise" (paying attention to the breath, paying attention to the lecture, paying attention to the music) in an effort to control for demand characteristics. The mode of presentation (audio) was also matched across conditions.

The music condition was included specifically to test whether positive mood accounted for any of observed behavioral effects.

After completing the “attention exercise,” subjects followed the same procedures as in Study 2.a., involving the brief reflection exercise using the quarter sheet of paper provided by the researcher followed by the circle drawing exercise modeled after the IOS.

Subjects then completed a second set of surveys, which included the Situational Self-Awareness Scale (SAAS; Govern & Marsch, 2001), Toronto Mindfulness Scale (TMS; Lau et al., 2006), Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988), and Marlowe-Crowne Social Desirability Scale (Reynolds, 1982). Additionally, subjects were asked to reflect on why they drew their circles as they did and were provided with open-ended response space in which to type out their reflections and explain their thought-process.

After completing the surveys, the same observation-derived measures of pro-environmental and pro-social behavior as in Study 2.a. were collected. Subjects were debriefed by email only after all experimental procedures had been completed.

### **Study 2.b. Results**

Data from Study 2.b. were subject to one-way ANOVA. Pre-induction, groups did not differ in baseline compassion (SCBCS;  $F(2,57) = .276, p = .760$ ), importance of moral identity (SIMIS;  $F(2,57) = 2.096, p = .132$ ), connection to nature (CNS;  $F(2,57) = .429, p = .653$ ) or trait mindfulness (MAAS;  $F(2,57) = .280, p = .757$ ). Post-induction, groups differed significantly in self-environment size ratio ( $F(2,57) = 3.982, p = .024$ ) and in self-environment overlap ( $F(2,57) = 3.874, p = .026$ ) but not in self-community ratio ( $F(2,57)$

= .064,  $p = .938$ ), self-community overlap ( $F(2,57) = 1.958$ ,  $p = .151$ ), self-thought ratio ( $F(2,57) = .059$ ,  $p = .943$ ), or self-thought overlap ( $F(2,57) = .141$ ,  $p = .869$ ).

The type of induction had a significant effect on use of trash ( $F(2,57) = 4.181$ ,  $p = .02$ ) and recycling ( $F(2,57) = 4.101$ ,  $p = .022$ ) but not lost data ( $F(2,57) = 2.344$ ,  $p = .105$ ). Groups differed significantly in state mindfulness (TMS;  $F(2,57) = 4.295$ ,  $p = .018$ ) and positive mood (PANAS-P;  $F(2,57) = 2.587$ ,  $p = .084$ ) as a function of induction type but not in negative mood (PANAS-N;  $F(2,57) = .013$ ,  $p = .987$ ) or self-awareness (SSAS;  $F(2,57) = 2.133$ ,  $p = .128$ ). The type of induction also affected enjoyment of the experiment ( $F(2,57) = 3.501$ ,  $p = .037$ ).

Post-hoc analyses revealed which conditions (henceforth: lecture, music, and mindfulness) differed significantly from others. Multiple comparisons using Tukey's HSD showed that the difference between mindfulness and lecture for use of trash was marginally significant ( $p = .061$ ) so that mindfulness subjects were less likely ( $M = .30$ ,  $SE = .10513$ ) and lecture subjects were more likely ( $M = .65$ ,  $SE = .10942$ ) to dispose of the quarter sheet of paper in the trash on their way out of the lab. The difference between mindfulness and music for use of trash was significant ( $p = .027$ ) so that mindfulness subjects were significantly less likely and music subjects were significantly more likely ( $M = .70$ ,  $SE = .10513$ ) to dispose of the quarter sheet of paper in the trash on their way out of the lab. There was no significant difference between lecture and music for use of trash ( $p = .941$ ).

For use of recycling, there was a significant difference between mindfulness and lecture ( $p = .042$ ) in which mindfulness subjects were significantly more likely to recycle ( $M = .55$ ,  $SE = .11413$ ) and lecture subjects were significantly less likely to recycle ( $M = .20$ ,  $SE = .09177$ ). There was also a significant difference between mindfulness and music ( $p = .042$ )

in which mindfulness subjects were significantly more likely to recycle and music subjects were significantly less likely to recycle ( $M = .20$ ,  $SE = .09177$ ). There was no significant difference in recycling between lecture and music for recycling ( $p = 1.00$ ).

For willingness to help, the difference between mindfulness and lecture was marginally significant ( $p = .089$ ) so that mindfulness subjects were more likely ( $M = .30$ ,  $SE = .10513$ ) and lecture subjects were less likely ( $M = .05$ ,  $SE = .05$ ) to indicate a willingness to help recover “lost data.” There was no significant difference between mindfulness and music ( $p = .406$ ) although numerically, mindfulness subjects were still slightly more likely than music subjects ( $M = .15$ ,  $SE = .08192$ ) to indicate a willingness to help. There was no significant difference between lecture and music in willingness to help ( $p = .667$ ).

For state mindfulness (TMS), the mindfulness condition differed significantly from music ( $p = .015$ ) so that mindfulness subjects scored higher on state mindfulness ( $M = 3.51$ ,  $SE = .10274$ ) than subjects in the music condition ( $M = 2.9767$ ,  $SE = .15637$ ). The mindfulness condition did not differ significantly ( $p = .155$ ) from lecture ( $M = 3.1633$ ,  $SE = .12709$ ). There was no significant difference in state mindfulness between music and lecture conditions ( $p = .573$ ).

For positive mood (PANAS-P), there was a marginally significant difference between the mindfulness and music conditions ( $p = .07$ ) in which subjects in the music condition expressed more positive affect ( $M = 2.8$ ,  $SE = .16607$ ) than mindfulness subjects ( $M = 2.275$ ,  $SE = .18805$ ). There was no significant difference ( $p = .654$ ) between mindfulness and lecture ( $M = 2.48$ ,  $SE = .13506$ ). There was also no significant difference ( $p = .36$ ) between music and lecture in positive mood.

For enjoyment of the experiment, there was a significant difference between music and lecture ( $p = .036$ ) in which participants in the music condition ( $M = 4.2, SE = .15560$ ) reported enjoying the experiment significantly more than subjects in the lecture condition ( $M = 3.6, SE = .16859$ ). There was no significant difference ( $p = .146$ ) between music and mindfulness ( $M = 3.75, SE = .17584$ ) despite music being rated as numerically higher in enjoyableness. There was also no significant difference ( $p = .801$ ) between mindfulness and lecture conditions.

For self-environment size ratio, there was a marginally significant difference between mindfulness and music conditions ( $p = .056$ ) so that mindfulness subjects depicted themselves as more similar in size to the environment ( $M = .7067, SE = .08505$ ) than music subjects ( $M = .3988, SE = .09619$ ). Furthermore, there was a significant difference between mindfulness and lecture conditions ( $p = .038$ ) so that mindfulness subjects depicted themselves as more similar in size to the environment than lecture subjects ( $M = .3777, SE = .09520$ ). There was no significant difference between music and lecture conditions ( $p = .986$ ).

For self-environment overlap, there was no significant difference between mindfulness and music conditions ( $p = .136$ ), even though mindfulness subjects depicted themselves as more overlapping with the environment ( $M = .4262, SE = .09585$ ) than music subjects ( $M = .2174, SE = .07869$ ). However, there was a significant difference between mindfulness and lecture conditions ( $p = .025$ ) so that mindfulness subjects depicted themselves as more similar in size to the environment than lecture subjects ( $M = .1364, SE = .19675$ ). There was no significant difference between music and lecture conditions ( $p = .733$ ).

### **Study 2.b. Discussion**

Study 2.b. was a replication attempt of Study 2.a. that also introduced an additional condition (positive mood induction through music) to assess the possible role of mood in contributing to pro-social and pro-environmental behavior. If mood was the driving factor behind pro-social and pro-environmental behavior, the music condition (in which subjects reported the most positive affect and also reported enjoying the experiment the most) should have led to more recycling and volunteering, but it did not. Instead, the mindfulness condition led to significantly more recycling than either the lecture or music conditions. As the mindfulness condition also led to significantly higher state mindfulness and self-environment overlap, it seems highly likely that state mindfulness and self-environment overlap may have influenced behavior. Self-construal, as reflected in self-environment overlap, may have mediated the relationship between mindfulness and pro-environmental behavior.

In Study 2.b., the previously observed pro-social effect did not replicate, nor did self-community overlap. This may in part be due to the length and timing of the study. Study 2.a. was a half-hour study while 2.b. was an hour long. Furthermore, study 2.a. took place near the beginning of the academic quarter, when students were relatively less busy, while study 2.b. took place during the second half of the quarter (half way through the quarter until the end of the quarter), when students were likely occupied with midterms and final exams and thus less likely to have time to come back into the lab. Future replication attempts should make an effort to match the duration of the studies as well as their timing during the quarter in order to control for these possible influences on subjects' willingness to volunteer their time to help.

## **Study 3 Method**

### **Participants**

A total of 92 undergraduates (aged 17-23:  $M = 18.88$ ,  $SD = 1.201$ , 53 Female) enrolled in Psych 1 and Psych 7 were recruited through the UCSB Sona Systems subject pool to participate in a study entitled “Attitudes in Life: Personality and Reflection.” Subjects received course credit for their participation.

### **Procedures**

After indicating their consent, subjects were asked to complete the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003), Neuroticism and Openness to Experiences sub-scales of the Big 5 Personality Inventory (John & Srivastava, 1999), the Self-Consciousness Scale-Revised (Scheier & Carver, 1985), and Reflection Scale (Trapnell & Campbell, 1999) as baseline individual differences measures.

Subjects were randomly assigned to one of four conditions: 1) mortality salience prime followed by mindfulness induction, 2) mortality salience prime followed by lecture on the respiratory system, 3) dental pain prime followed by mindfulness induction, or 4) dental pain prime followed by lecture on the respiratory system.

Upon completion of baseline measures, subjects were first either given a mortality salience prime or a dental pain prime. Following Greenberg et al. (1990), in the mortality salience condition, they were asked to “Please write about what you think will happen to you as you physically die,” and “Please write about the emotions that the thought of your own death arouse in you.” In the dental pain condition, they were asked to “Please write about the physical experience of dental pain,” and “Please write about the emotions that the thought of your own dental pain arouse in you.”

After the writing prime, subjects were randomly assigned to either a mindfulness condition or a control condition. In the mindfulness condition, they listened to a 10-minute guided mindfulness meditation delivered by Jon Kabat-Zinn, a Professor of Medicine who specializes in mindfulness and healthcare. In the control condition, they listened to a 10-minute educator.com lecture on the human respiratory system delivered by Bryan Cardella, a Professor of Biology who specializes in anatomy and physiology. Both audio clips were matched in terms of their duration, breath-related content, and quality of delivery (as well as reputability of the speaker); the mindfulness audio differed in its focus on actually bringing attention to the breath through meditation practice, an experientially-oriented approach, while the lecture on respiration was cognitively-oriented and merely intellectual in its content.

Next, subjects completed an additional set of questionnaires: the state version of the Mindfulness Attention Awareness Scale (MAAS-state; Brown & Ryan, 2003) and a mood measure used by Greenberg et al. (1990) in their mortality salience research (i.e., on a scale from 1-9, how happy, calm, irritated, secure, angry, disturbed, hostile, and frustrated are you?). Subjects also completed a digitized version of the IOS in which they were asked to use a sliding scale (anchored at 0% and 100%) to indicate how they currently felt in terms of connection between self and [environment, community, thoughts].

Subjects were then introduced to the in-group/out-group rating task. In this task, they were presented with brief descriptions of two people who were introduced as if they were real but whose descriptions were in fact written by the experimenter and her research assistant: an in-group member (“Will,” a fellow UCSB student) or an out-group member (“Abioye,” member of the Bantu tribe of South Africa). The descriptions of the two people (Person A and Person B) were presented one after the other in counterbalanced order.



Subjects were then asked to rate each person on various criteria, as indicated by the Interpersonal Rating Scales used by Greenberg et al. (1990). In addition to interpersonal ratings, subjects were also asked how they would split a hypothetical \$10 between self and other in two separate scenarios: 1) self and person A, and 2) self and person B (counterbalanced for order). After the in-group/out-group task, subjects were debriefed about the true nature of the in-group/out-group descriptions (namely, that they were written by the experimenter and her research assistant) and the purpose of the study. They were also asked to rate, on a scale of 1-7 (where 1 = not at all and 7 = extremely) how much they enjoyed the experiment. Subjects were compensated with course credit for their participation.

### **Study 3 Results**

Data from Study 3 were subject to one-way ANOVA. In the pre-prime/pre-induction self-report measures, there was no significant difference between conditions in trait mindfulness ( $F(3,88) = .053, p = .984$ ), openness to experience ( $F(3,88) = 1.189, p = .319$ ), reflection ( $F(3,88) = .224, p = .880$ ), self-consciousness ( $F(3,88) = .550, p = .650$ ), positive mood ( $F(3,88) = 2.06, p = .111$ .) or negative mood ( $F(3,88) = .756, p = .522$ ). However, there was a significant difference between conditions in neuroticism ( $F(3,88) = 3.346, p = .023$ ). Post-hoc Tukey's HSD revealed the only significant difference in neuroticism pre-induction ( $p = .028$ ) was between Mortality+Lecture ( $M = 3.2671, SD = .61113$ ) and Pain+Mindfulness ( $M = 2.7329, SD = .63787$ ) conditions.

There was no significant difference between conditions in negative mood post-induction ( $F(3,88) = 1.689, p = .175$ ), but there was a significant difference between conditions in positive mood post-induction ( $F(3,88) = 6.706, p < .001$ ). Post-hoc Tukey's HSD revealed a significant difference in positive mood post-induction between

Mortality+Mindfulness and Pain+Lecture conditions ( $p < .001$ ), so that subjects in the Mortality+Mindfulness condition reported more positive affect ( $M = 7.3889$ ,  $SD = 1.05256$ ) and subjects in the Pain+Lecture condition reported less positive affect ( $M = 5.6515$ ,  $SD = 1.33523$ ). There was also a significant difference in positive mood post-induction between Pain+Mindfulness and Pain+Lecture conditions ( $p = .014$ ), so that subjects in the Pain+Mindfulness condition reported more positive affect ( $M = 6.9130$ ,  $SD = 1.60874$ ) and subjects in the Pain+Lecture condition reported less positive affect, as reported above.

Post-prime/post-induction, there were no significant differences between conditions in trait index ratings of the in-group member ( $F(3,88) = 1.534$ ,  $p = .211$ ) yet there were significant differences between conditions in trait index ratings of the out-group member ( $F(3,88) = 3.117$ ,  $p = .03$ ). There were no significant differences in interpersonal judgement scale ratings of the in-group member ( $F(3,88) = 1.967$ ,  $p = .125$ ) and no significant differences in interpersonal judgement scale ratings of the out-group member ( $F(3,88) = 1.38$ ,  $p = .254$ ). There were significant differences between conditions in out-group sharing preference ( $F(3,88) = 3.856$ ,  $p = .012$ ) but not in-group sharing preference ( $F(3,88) = .839$ ,  $p = .476$ ).

Post-hoc Tukey's HSD showed that for trait index ratings of the out-group member, the Mortality+Mindfulness condition did not significantly differ from a.) Mortality+Lecture ( $p = .234$ ), differed significantly from b.) Pain+Lecture ( $p = .017$ ), and did not differ significantly from c.) Pain+Mindfulness ( $p = .343$ ). Mortality+Mindfulness ( $M = 6.9229$ ,  $SD = .74615$ ) was not significantly different from a.) Mortality+Lecture ( $M = 6.3413$ ,  $SD = 1.24167$ ), but was significantly different from b.) Pain+Lecture ( $M = 5.9909$ ,  $SD = 1.12341$ ), and was not significantly different from c.) Pain+Mindfulness ( $M = 6.4109$ ,  $SD = 1.03$ ).

There were no significant differences between Mortality+Lecture and Pain+Lecture ( $p = .677$ ), Mortality+Lecture and Pain+Mindfulness ( $p = .996$ ), or Pain+Mindfulness and Pain+Lecture ( $p = .537$ ).

For out-group sharing preference, the Mortality+Mindfulness condition differed significantly from a.) Mortality+Lecture ( $p = .008$ ), was marginally different from b.) Pain+Lecture ( $p = .096$ ), and did not differ significantly from c.) Pain+Mindfulness ( $p = .299$ ). Sharing with the out-group by the Mortality+Mindfulness condition ( $M = .0833$ ,  $SD = 4.47133$ ) was significantly higher than a.) Mortality+Lecture ( $M = -4.1304$ ,  $SD = 4.71269$ ), marginally higher than b.) Pain+Lecture ( $M = -2.9545$ ,  $SD = 4.16879$ ) and was numerically higher but not significantly so relative to c.) Pain+Mindfulness ( $M = -2.1739$ ,  $SD = 4.17408$ ). There were no significant differences between Mortality+Lecture and Pain+Lecture ( $p = .806$ ), Mortality+Lecture and Pain+Mindfulness ( $p = .435$ ), or Pain+Mindfulness and Pain+Lecture ( $p = .933$ ).

There was no significant difference between conditions in self-environment overlap ( $F(3,88) = .706$ ,  $p = .551$ ) or in self-community overlap ( $F(3,88) = .401$ ,  $p = .753$ ). However, there was a significant difference between conditions in self-thoughts overlap ( $F(3,88) = 4.729$ ,  $p = .004$ ). Post-hoc Tukey's HSD revealed a significant difference in self-thoughts overlap between Mortality+Mindfulness and Pain+Lecture ( $p = .002$ ) so that subjects in the Mortality+Mindfulness condition ( $M = 81.5833$ ,  $SD = 17.22465$ ) reported significantly more self-thoughts overlap than did subjects in the Pain+Lecture condition ( $M = 55.5455$ ,  $SD = 23.08107$ ). The difference between Mortality+Mindfulness and Mortality+Lecture was trending toward significance ( $p = .120$ ), with Mortality+Mindfulness greater than Mortality+Lecture ( $M = 65.9565$ ,  $SD = 28.50754$ ). There was also a marginally significant

difference ( $p = .091$ ) between Mortality+Mindfulness and Pain+Mindfulness ( $M = 65.0870$ ,  $SD = 25.48424$ ) in which self-thoughts overlap in the Mortality+Mindfulness condition was greatest.

### **Study 3 Discussion**

In Study 3, the only pre-prime/pre-induction self-report difference was in neuroticism scores, which indicated that subjects randomly assigned to the Mortality+Lecture condition just so happened to be more neurotic than subjects who were randomly assigned to the Pain+Mindfulness condition. This finding seemed to have no bearing on the other results. The only post-prime/post-induction self-report difference was in positive mood scores, which indicated that subjects in the Mortality+Mindfulness condition and Pain+Mindfulness reported the most positive affect, respectively, and were both significantly different from subjects in the Pain+Lecture condition, who reported the least positive affect. From these findings, it may be the case that positive mood influenced subsequent ratings and willingness to share with the out-group. However, the fact that of all the prime-induction combinations, the Mortality+Mindfulness condition elicited the greatest post-induction positive affect is unprecedented, especially given the negative affect associated with mortality salience. This suggests that even a 10 minute mindfulness induction may be enough to reverse the mood effects of a mortality salience prime, allowing subjects to, in a small way, come to terms with their own mortality, at least insofar as not being emotionally disturbed by the thought of their own death in the short-term.

Although there were no significant differences between conditions in trait index ratings of the in-group member, there were significant differences in ratings of the out-group member. For both the in- and out-group member, there were no significant differences in

interpersonal judgement scale ratings. However, there were significant differences between conditions in out-group sharing preference although not in-group sharing preference.

Post-hoc analyses demonstrated that for trait index ratings of the out-group, subjects in the Mortality+Mindfulness condition did not rate the out-group differently from Mortality+Lecture or from Pain+Mindfulness, but rated the out-group significantly more favorably than did subjects in the Pain+Lecture condition. There were no significant differences between Mortality+Lecture and Pain+Lecture, Mortality+Lecture and Pain+Mindfulness, or Pain+Mindfulness and Pain+Lecture in out-group trait index ratings.

There were also significant differences in out-group sharing preference. Sharing with the out-group by the Mortality+Mindfulness condition was significantly higher than Mortality+Lecture, marginally higher than Pain+Lecture, and although not significantly, was still numerically higher than Pain+Mindfulness. There were no significant differences between Mortality+Lecture and Pain+Lecture, Mortality+Lecture and Pain+Mindfulness, or Pain+Mindfulness and Pain+Lecture in out-group sharing preference.

In combination, the positive effects of the Mortality+Mindfulness prime-induction combination on out-group trait index ratings and out-group sharing preference suggests something unique about this combination of activities. Contemplating one's own death, both physically and emotionally, is a visceral experience that typically evokes aversion and avoidance. Yet when this contemplation is followed immediately by the practice of mindfulness, involving bringing one's attention to whatever experiences inhabit the present moment without judgement, subjects reported greater overlap between self and thoughts, suggesting not that they suppressed the earlier thoughts about their own mortality, but that they were perhaps able to confront their thoughts, even those concerning death, mindfully –

with a willingness to be present to them, whatever their content, in equanimity. They subsequently reported greater positive affect, more favorable out-group trait index ratings, and a greater willingness to share with the out-group member, suggesting a shift in their relation to their own feelings as well as the “other.” The combined shift in self-thoughts overlap and in positive mood post-mindfulness seemed to influence their subsequent perception of the out-group member, perhaps by allowing them to see through and (at least momentarily) transcend their aversions to negative thoughts and to people who they might otherwise perceive as different from themselves.

### **General Discussion**

The combined results of studies 1-3 suggest a connection between mindfulness and self-construal that has until now received little to no attention in empirical research. As shown by study 1, dispositional mindfulness is associated with a more egalitarian and interdependent (i.e., horizontal-collectivist) self-construal as well as greater connection between one’s self, the environment, and one’s community. Studies 2.a. and 2.b. suggest a role for even brief mindfulness practice in increasing short-term, small-scale pro-social and pro-environmental behaviors. The results of study 3 suggest that mindfulness practice can reduce existential anxiety, decrease aversion to an out-group, and facilitate pro-social giving. Mindfulness may therefore allow individuals to better cope with the recognition of their own mortality. By maintaining one’s attention in the present moment with an attitude of non-judgment, one becomes less reactive to and more accepting of one’s immediate experience and all it entails, regardless of its emotional valence (Shapiro et al., 2006). These data serve as a foundation for exploring other dimensions of self-construal in relationship to mindfulness.

### **Future Directions: “Self-Transcendent Mindfulness” and the Metapersonal Self**

In order to explore other dimensions of self-construal and its relationship to mindfulness, it may be useful to further examine the theories set forth by existential psychology and transpersonal psychology. While the independent and interdependent self-construals have gained traction in social psychology, more recently, metapersonal self-construal has been set forth as an extension of the self-construal literature. Metapersonal self-construal refers to the perception of the self as being deeply interconnected with all forms of life (DeCicco & Stroink, 2007; Stroink & DeCicco, 2011). Although similar to the interdependent self, the metapersonal self is differentiated by its inclusivity and scope. While the interdependent self is concerned about harmonious relationships with specific other human beings, the metapersonal self-construal involves the perception of the self as having a deep interconnection with all forms of life, nature, and even the cosmos (Arnocky, Stroink & DeCicco, 2007; Stroink & Decicco, 2011), thus forming an allo-inclusive identity (Leary et al., 2008). While the interdependent self is interpersonal, the metapersonal self could be considered transpersonal. Indeed, the metapersonal self has received little attention aside from among transpersonal psychologists, perhaps because it transcends the boundaries of ordinary understandings of selves, especially in a modern, Western scientific context. This, however, makes it especially relevant to the social psychology of mindfulness.

The self-transcendence implied by metapersonal self-construal aligns it with the Buddhist notion of not-self, the understanding that there is no substantial self that is inherent to experience. In a more psychological context, Schultz and Zelezny (1999) suggest that self-transcendence reflects the degree to which a person values goals and ideals that are not directly linked to self (e.g., honesty, fairness), while self-enhancement reflects how much a

person values goals and ideals that are directly linked with tangible rewards for self (e.g., success, ambition, wealth). Given the overlap between metapersonal self-construal—the perception of oneself as embedded within a global environment and at one with the cosmos (DeCicco & Stroink, 2007)—and metaphysical views of one’s place in the universe, there appears to be room for comparisons between this mode of self-construal and mindfulness. One could say the metapersonal self is reminiscent of mystical experiences reported among contemplatives from the various spiritual traditions of antiquity, of which secular mindfulness is a modern adaptation. Understandably then, the metapersonal self is generally associated with the belief systems held by religiocultural groups like Buddhism (Stroink & DeCicco, 2011). Indeed, Buddhist meditation has been shown to impact self-directedness, cooperativeness, and self-transcendence, representing the intrapersonal, interpersonal, and transpersonal levels of self-concept, respectively (Haimerl & Valentine, 2001). The transpersonal (metapersonal) aspect in particular is an essential part of Buddhist mindfulness practice.

Metapersonal self-construal bears striking resemblance to many of the metaphysical teachings of the contemplative traditions, including Buddhism, whose subtle influence can be felt on mindfulness and the psychological study thereof. Such metaphysical teachings include the absence of ego, the dissolution of separation between self and other, connection with all beings and with nature, and in certain schools the intention to delay one’s personal liberation in order to help rid all beings of suffering out of compassion (Wallace & Wallace, 1997). Such transformation of the “self” in relation to the “other” via mindfulness and meditation is not only anecdotally reported, but also supported by emerging experimental data. For example, trait mindfulness is related to the metapersonal self-construal but not the



independent or interdependent selves (Mara, DeCicco & Stroink, 2010; Stroink & Dupuis, 2007). These findings represent the only documented associations between mindfulness and an explicit self-construal measure.

This self-transcendent state may be the result of the unique mechanisms by which mindfulness works. Such mechanisms include the development of meta-awareness, perspective taking abilities, cognitive reappraisal, and self-inquiry, which may be used to target states of maladaptive self-schema and cognitive reification (Dahl, Lutz & Davidson, 2015). Metacognitive awareness in particular is a pivotal feature of mindfulness that is arguably responsible for transforming the sense of self. In a clinical context, metacognitive awareness is a cognitive set in which negative thoughts and feelings are experienced as mental events rather than as the self (Teasdale et al., 2002). In non-clinical contexts, this may more broadly involve the ability to transcend the tendency to identify strongly as an individual self. It is therefore plausible that metapersonal self-construal may be related somehow to meta-awareness, the ability to take explicit note of the current contents of one's consciousness and challenge their validity. Mindfulness increases meta-awareness and may thus lead to self-transcendence via the noticing of one's fluctuating states of consciousness, which are seen to be devoid of a "self" that is separate and disconnected from the "other."

The implications of the metapersonal self-construal and the realization self-transcendence via mindfulness are particularly noteworthy. Metapersonal self-construal uniquely predicts biospheric environmental concern, ecological cooperation, and self-reports of environmental conservation behavior (Arnocky, Stroink & DeCicco, 2007), understandable given its emphasis on connectedness to nature. Correlations exist between incorporation of nature into one's identity and well-being (Howell et al., 2011; Zelenski &

Nisbet, 2012), suggesting the importance of the metapersonal self-construal to planetary well-being. Research also suggests connections between planetary and personal well-being in terms of relationships among environmentally responsible behavior and formal meditation practice (Jacob, Jovic & Brinkerhoff, 2009). These relationships open up the possibility of finding further connections between mindfulness, self-construal and environmentally conscientious behavior, which the present research begins to examine.

Future studies should explicitly explore the potential mediating role of self-construal in the relationship between mindfulness and pro-social and pro-environmental behavior. Such studies would also benefit from including a measure of metapersonal self-construal, which has validated associations with pro-environmental behavior and reflects greater connection to abstract collectives, such as the universe as a whole. Given the rapid advancement of mindfulness research, there is great potential for the integration of theories from cultural psychology, existential psychology, and transpersonal psychology into empirical investigations of mindfulness, both in the lab and in the field.

## **Conclusion**

The present research begins to fill the conspicuous gap in the psychological study of mindfulness by shedding light on the practical social and environmental correlations and effects of mindfulness in ecologically viable contexts. The studies contained therein are among the first to introduce self-construal into the mindfulness literature and to propose an empirical examination of self-transcendent or “selfless” behaviors in connection with brief mindfulness practice. Further examination of the broader implications of self-transcendence, beyond the small-scale and short-term variations explored in the present research, is needed.

Furthermore, the present research contributes important empirical data to the until now unexamined effects of mindfulness practice as a potential buffer against the typically adverse effects of mortality salience, thus serving as a foundation for future research further examining the implications of the “existential present,” the ability to be mindful of both life and death with a sense of equanimity. That each of us inhabits a world fully known only to ourselves, in addition to the fact that our world will disappear at the time of death, typically creates anxiety (Yalom 2008, p. 121-122). Yet instead of becoming overwhelmed by terror at the thought of one’s own mortality and isolation, through mindfulness an individual may gain acceptance and equanimity around death as well as a sense of common humanity and recognition of shared mortality, truly internalizing that they are not alone in their predicament and that all lives must come to an end, potentially closing the gap between “self” and the “other.”

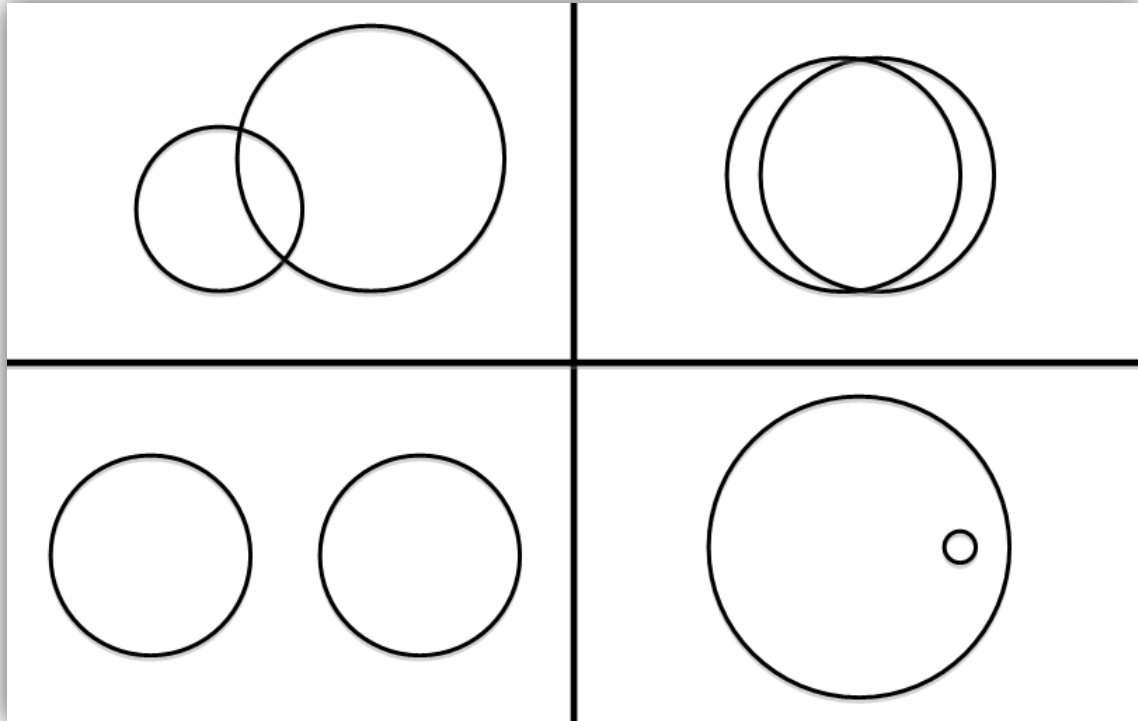
Further research is needed to flesh out these theories on the relationship between mindfulness and existentialism. Yet the present data nonetheless lends support to the efficacy of mindfulness in practice and the importance of further experimental investigations of mindfulness both across the developmental lifespan and across cultures, ideally integrating perspectives from developmental psychology, cultural psychology, mindfulness practice, and existential theory in order to better understand the aspects of mindfulness that hold the best outcomes for individuals and the communities in which they are inextricably embedded. With further research in this area, the future of mindfulness studies in collaboration with social psychology stands to add significantly to the self-construal literature, both theoretically and practically.

In conclusion, the mindful “self” may in fact transcend all construal, being a selfless “self” (i.e., not a self) that needs no narrative embellishment, instead remaining perfectly still and without the obscurations of conceptual proliferation. As one of the first “psychologists” to explore the subject of “self” and its construal, the Buddha is reported to have said:

“He has been stilled where the currents of construing do not flow. And when the currents of construing do not flow, he is said to be a sage at peace.’ Thus was it said. With reference to what was it said? ‘I am’ is a construing. ‘I am this’ is a construing. ‘I shall be’ is a construing. ‘I shall not be’... [...] By going beyond all construing, he is said to be a sage at peace.”

— Buddha, Dhatu-vibhanga  
Sutta: An Analysis of the  
Properties (MN 140, trans.  
Thanissaro Bhikkhu, 1997)

## Appendix



*Figure 1.* The Inclusion of the Other in the Self Scale – Revised (IOS-R). Featured here are four examples of possible depictions of self and other circles. The IOS-R presents a more flexible mode of depicting self and other by serving as a continuous measure of inclusivity and by allowing for size variation.

### Correlations

		Self-Thoughts Overlap	Satisfaction with Life
Self-Thoughts Overlap	Pearson Correlation	1	.226**
	Sig. (2-tailed)		.010
	N	130	130
Satisfaction with Life	Pearson Correlation	.226**	1
	Sig. (2-tailed)	.010	
	N	130	130

\*\* . Correlation is significant at the 0.01 level (2-tailed).

*Figure 2.* Correlation between self-thoughts overlap and satisfaction with life. Bivariate correlation analysis revealed a significant positive relationship between self-thoughts overlap

and satisfaction with life. Participants reporting greater overlap between self and thoughts also indicated greater satisfaction with life.

		Correlations				
		Self-Community Overlap	Horizontal Collectivism	Vertical Collectivism	Collectivism	Common Humanity
Self-Community Overlap	Pearson Correlation	1	.149	.190*	.242**	.210*
	Sig. (2-tailed)		.091	.031	.005	.016
	N	130	130	130	130	130
Horizontal Collectivism	Pearson Correlation	.149	1	-.009	.629**	.210*
	Sig. (2-tailed)	.091		.923	.000	.016
	N	130	130	130	130	130
Vertical Collectivism	Pearson Correlation	.190*	-.009	1	.772**	.196*
	Sig. (2-tailed)	.031	.923		.000	.025
	N	130	130	130	130	130
Collectivism	Pearson Correlation	.242**	.629**	.772**	1	.286**
	Sig. (2-tailed)	.005	.000	.000		.001
	N	130	130	130	130	130
Common Humanity	Pearson Correlation	.210*	.210*	.196*	.286**	1
	Sig. (2-tailed)	.016	.016	.025	.001	
	N	130	130	130	130	130

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

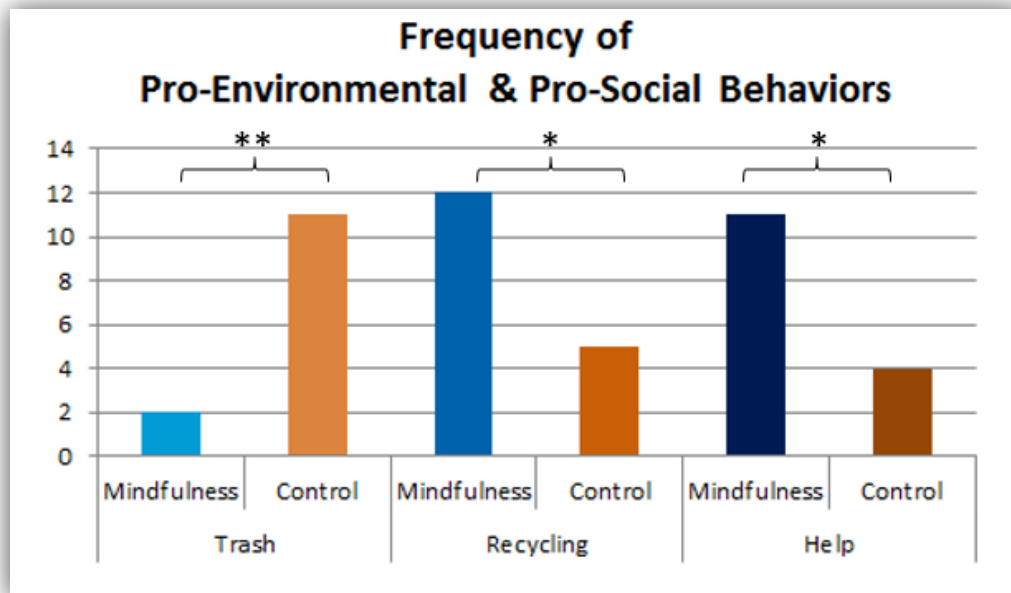
*Figure 3.* Correlations between self-community overlap, collectivism, and common humanity. Bivariate correlation analysis revealed significant positive correlations between self-community overlap and collectivism, more-so with vertical collectivism than with horizontal collectivism. Common humanity was also positively correlated with self-community overlap as well as all dimensions of collectivism.

		Correlations	
		Self-Environment Overlap	Connection to Nature
Self-Environment Overlap	Pearson Correlation	1	.175*
	Sig. (2-tailed)		.046
	N	130	130
Connection to Nature	Pearson Correlation	.175*	1
	Sig. (2-tailed)	.046	
	N	130	130

\*. Correlation is significant at the 0.05 level (2-tailed).

*Figure 4.* Correlations between self-environment overlap and connection to nature. Bivariate correlation analysis revealed a significant positive correlation between self-environment

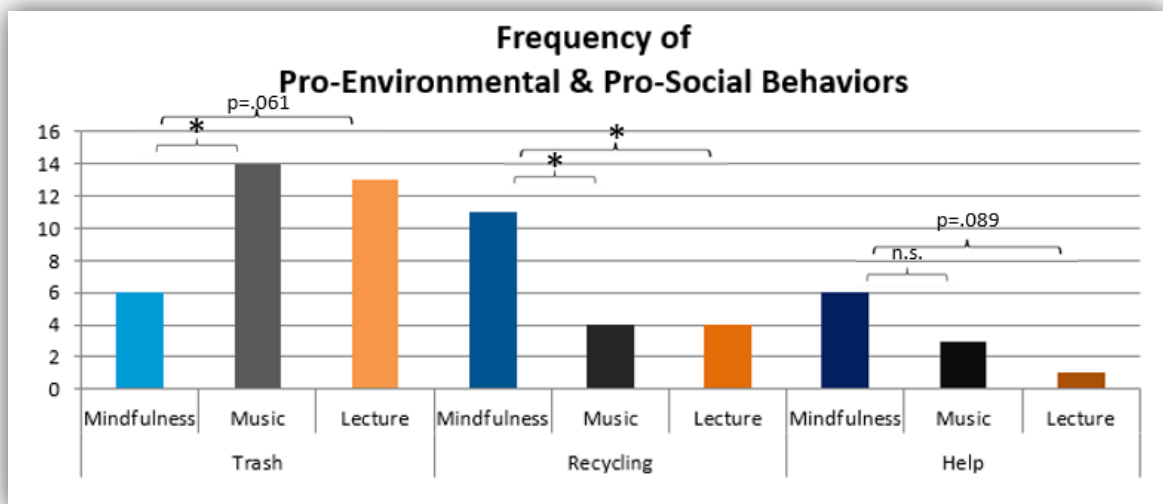
overlap and connection to nature. Participants who reported greater overlap between self and the environment also indicated greater connection to nature.



*Figure 5.* Frequency of pro-environmental and pro-social behaviors (Study 2.a.). Mindfulness and control conditions differed in all measures of pro-environmental and pro-social behavior: mindfulness subjects were significantly less likely to dispose of paper in the trash, more likely to recycle, and more likely to indicate a willingness to help recover “lost data.”

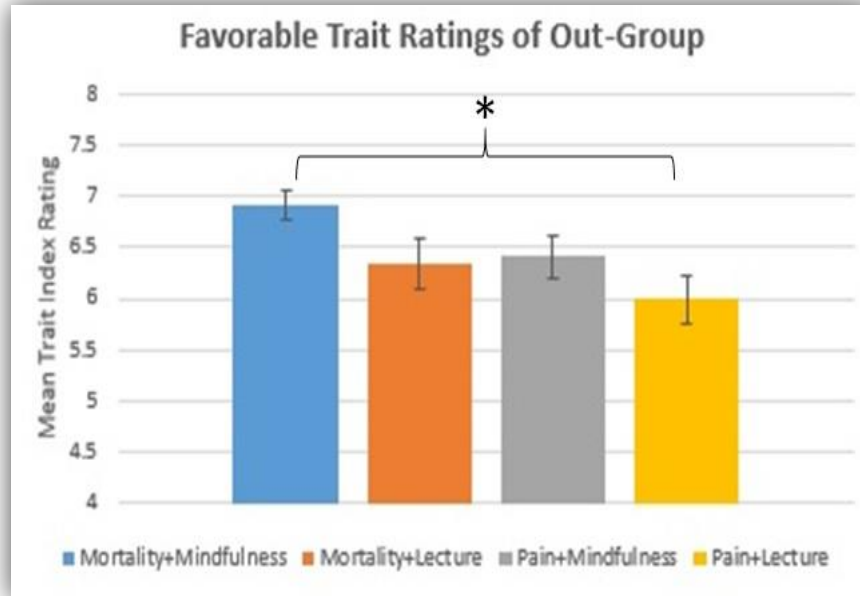
\* indicates that results were significant at the  $p < .05$  level.

\*\* indicates that results were significant at the  $p < .01$  level.



*Figure 6.* Frequency of pro-environmental and pro-social behaviors (Study 2.b.). Mindfulness subjects exhibited the most pro-environmental behaviors. Mindfulness subjects were lower in trash use and higher in recycling than music subjects. Mindfulness subjects were marginally lower in trash use and significantly higher in recycling than lecture subjects. There were no significant differences in pro-social helping behavior.

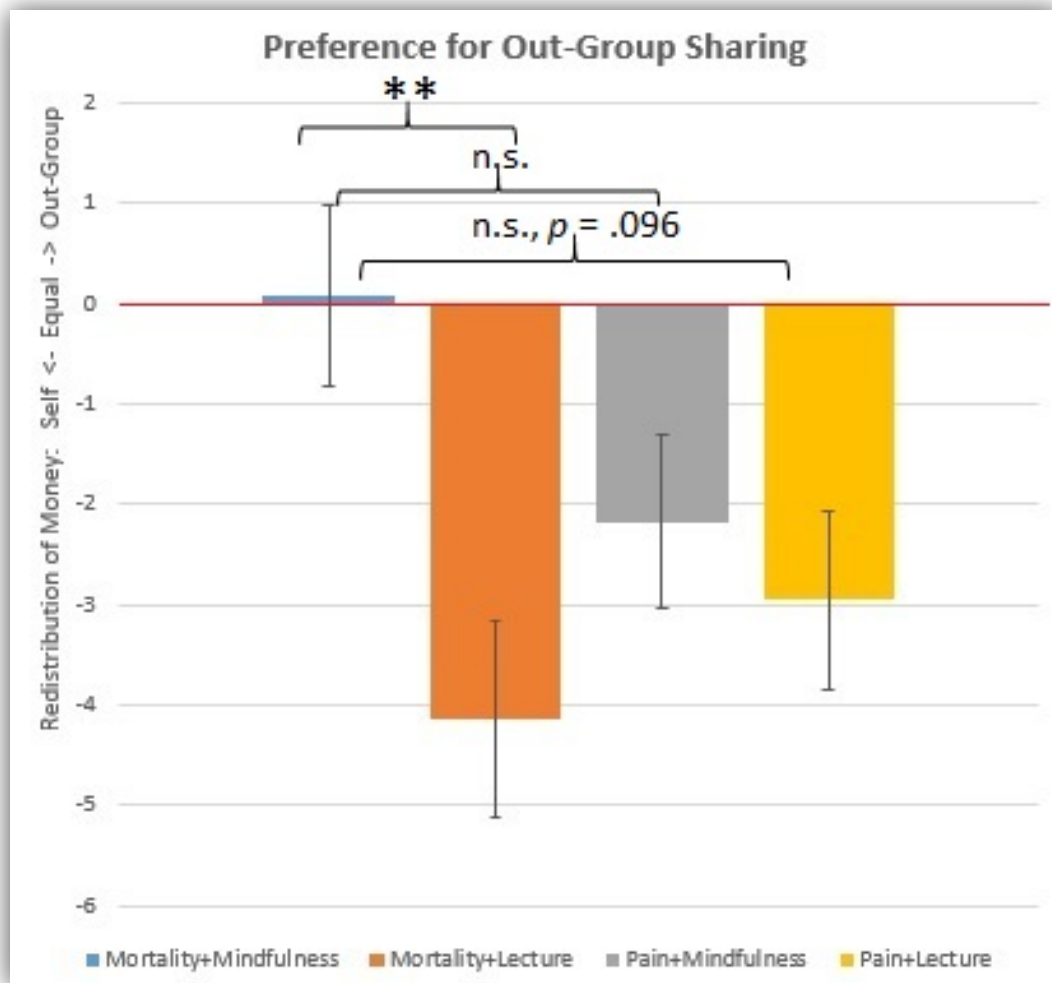
\* indicates that results were significant at the  $p < .05$  level.



*Figure 7.* Favorable trait ratings of out-group. Subjects receiving the mortality prime and mindfulness induction rated out-group members significantly more favorably than subjects receiving the pain prime and lecture induction. There were no significant differences between any other conditions.

\* indicates that results were significant at the  $p < .05$  level.





*Figure 8.* Preference for out-group sharing. Subjects receiving the mortality prime and mindfulness induction showed a significantly higher preference for out-group sharing than subjects receiving the mortality prime and lecture induction. A score of 0 indicates a preference for evenly splitting the \$10 during the money redistribution task. Negative scores indicate a preference toward keeping the money to oneself. Positive scores indicate a preference for giving the money to the out-group member.

\*\* indicates that results were significant at the  $p < .01$  level.

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